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[Continued on next page]

(54) Title: ISOLATION AND USE OF RYANODINE RECEPTORS

SEQ ID NO: 2 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
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SEQ ID NO: 130 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 144 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 146 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 4 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 6 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 8 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 10 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 56 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 57 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 58 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 59 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 60 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 61 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV
SEQ ID NO: 62 MAAEQQAS - EQDDVSLRTDMVCLSTATO - - - - - ERVCLAAEGLNHCFLNIAD - KNIPDLSQCVFVIRQALSVRALQELV

SEQ ID NO: 2 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 128 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 130 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 144 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 146 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 4 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 6 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 8 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 10 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 56 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 57 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 58 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 59 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 60 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 61 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ
SEQ ID NO: 62 TAAGSETQKE - - - - - NLGKOTGSHRTLLYGNAILLRHLSNMYLACLST - - - - - SSQKLAEPDVLQHSQGEACNWTLPASQKRSQ

(57) Abstract: The genes encoding ryanodine receptor homologs have been characterized from multiple insect families including lepidopteran tobacco budworm (*Heliothis virescens*), homopteran green peach aphid (*Myzus persicae*), corn plant hopper (*Peregrinus maidis*), cotton melon aphid (*Aphis gossypii*) and fruitfly (*Drosophila melanogaster*). The full-length genes have been isolated, cloned and amplified in bacterial cells. Expression in insect cells shows that the recombinant protein folds into a functional calcium release channel. The genes and their corresponding polypeptides have a number of uses including, but not limited to, the isolation of other pest ryanodine receptors, the development of screens to identify insecticidally active compounds, use of fragments of genes as pesticides, fragments of protein for antibody production, fragments of protein for determination of the structure of insecticide binding sites, and identification of insecticides that disrupt the calcium balance in cells through other messengers that interact with the receptor calcium release mechanism. Methods are outlined for overcoming toxic effects of expressing recombinant proteins in host cells.

WO 2004/027042 A2